

WHAT IS CLAIMED IS:

1. A toroidal-type continuously variable transmission, comprising:

an input shaft transmitting power from an engine;

5 a pair of input disks disposed in such a manner as to be spaced apart from each other in an axial direction of said input shaft;

a pair of output disks interposed between said pair of input disks in such a manner as to be opposed to said  
10 respective input disks;

a pressing mechanism pressing said input disk toward said output disk; and,

a hollow shaft disposed around an outer periphery of said input shaft concentrically with said input shaft,  
15 and connecting said pair of input disks to each other,

wherein said input shaft defines an oil hole formed in a no-penetrating portion of said input shaft where said input shaft does not penetrate through said hollow shaft, and opened on an outer peripheral surface of said  
20 no-penetrating portion, and

an oil passage is formed between an inner peripheral surface of said hollow shaft and an outer peripheral surface of a penetrating portion of said input shaft where said input shaft penetrates through said hollow shaft.

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2. The toroidal-type continuously variable

transmission as set forth in Claim 1, wherein said oil passage includes a groove formed in the outer peripheral surface of said input shaft and extending in the axial direction of said input shaft.

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3. The toroidal-type continuously variable transmission as set forth in Claim 2, wherein said groove is a spiral groove drawing a spiral extending in the opposite direction to the rotation direction of said input shaft from a torque inputting side end portion of said input shaft toward a torque transmitted side end portion of said input shaft.

4. The toroidal-type continuously variable transmission as set forth in Claim 1, wherein said pressing mechanism is a loading cam mechanism.

5. The toroidal-type continuously variable transmission as set forth in Claim 4, wherein said loading cam mechanism is covered with a cover member.

6. A continuously variable transmission apparatus including a combination of a toroidal-type continuously variable transmission with a planetary gear mechanism, said toroidal-type continuously variable transmission comprising:

an input shaft transmitting power from an engine;

a pair of input disks disposed in such a manner as to be spaced apart from each other in an axial direction of said input shaft;

5 a pair of output disks interposed between said pair of input disks in such a manner as to be opposed to said respective input disks;

a pressing mechanism pressing said input disk toward said output disk;

10 a hollow shaft disposed around an outer periphery of said input shaft concentrically with said input shaft, and connecting said pair of input disks to each other,

said input shaft defining an oil hole formed in a no-penetrating portion of said input shaft where said  
15 input shaft does not penetrate through said hollow shaft, and opened on an outer peripheral surface of said no-penetrating portion, and

an oil passage being formed between an inner peripheral surface of said hollow shaft and an outer peripheral surface  
20 of a penetrating portion of said input shaft where said input shaft penetrates through said hollow shaft; and

said planetary gear mechanism, comprising:

a first rotary body rotatable by said input shaft;

a second rotary body rotatable by said output disk;

25 and,

a clutch switching over the rotation movements of

said first and second rotary bodies to any of an advancing side high speed mode, an advancing side low speed mode and a retreating mode to transmit the same to <sup>an</sup> [said] output shaft.

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7. The continuously variable transmission apparatus as set forth in Claim 6, wherein said planetary gear mechanism further includes:

a sun gear disposed on said output shaft;

10 a ring gear disposed on the periphery of said sun gear concentrically with said sun gear and rotatable independently of said sun gear; and,

a planetary gear set including a pair of planetary gears respectively interposed between the inner peripheral surface of said ring gear and the outer peripheral surface of said sun gear.

8. The continuously variable transmission apparatus as set forth in Claim 6, wherein said oil passage includes a groove formed in the outer peripheral surface of said input shaft and extending in the axial direction of said input shaft.

9. The continuously variable transmission apparatus as set forth in Claim 8, wherein said groove is a spiral groove drawing a spiral extending in the opposite direction

to the rotation direction of said input shaft from a torque inputting side end portion of said input shaft toward a torque transmitting side end portion of said input shaft.

5        10. The continuously variable transmission apparatus as set forth in Claim 7, wherein said pressing mechanism is a loading cam mechanism, and said loading cam mechanism includes a cam disk having a cam surface and a roller.

10        11. The continuously variable transmission apparatus as set forth in Claim 10, wherein said cam disk includes an engaging portion on the opposite side to said cam surface and

wherein said transmission apparatus further comprises  
15 a linking member engageable with said engaging portion and rotatable integrally with said cam disk.

12. The continuously variable transmission apparatus as set forth in Claim 11, wherein said planetary gear  
20 mechanism further includes:

a high-speed clutch interposed between said first rotary body and said linking member for switching said rotation movement to said advancing side high speed mode;

a low-speed clutch interposed between said ring gear  
25 and second rotary body for switching said rotation movement to said advancing side low speed mode; and,

a retreating clutch interposed between said ring gear and a portion of a transmission case for switching said rotation movement to said retreating mode.

5        13. A continuously variable transmission apparatus including a combination of a toroidal-type continuously variable transmission with a planetary gear mechanism, said toroidal-type continuously variable transmission comprising:

10        an input shaft transmitting power from an engine;  
         an output shaft disposed in parallel to said input shaft;

         a pair of input disks disposed in such a manner as to be spaced apart from each other in an axial direction  
15 of said input shaft;

         a pair of output disks interposed between said pair of input disks in such a manner as to be opposed to said respective input disks;

         a pressing mechanism pressing said input disk toward  
20 said output disk;

         a hollow shaft disposed around an outer periphery of said input shaft concentrically with said input shaft, and connecting said pair of input disks to each other,

         said input shaft defining an oil hole formed in a  
25 no-penetrating portion of said input shaft where said input shaft does not penetrate through said hollow shaft,

and opened on an outer peripheral surface of said no-penetrating portion, and

an oil passage being formed between an inner peripheral surface of said hollow shaft and an outer peripheral surface of a penetrating portion of said input shaft where said input shaft penetrates through said hollow shaft; and

said planetary gear mechanism, comprising:

a linking member rotatable integrally with said input shaft;

a first rotary body rotatable integrally with said linking member;

a second rotary body rotatable by said output disk; and,

a clutch for switching over the rotation movements of said first and second rotary bodies to any one of an advancing side high speed mode, an advancing side low speed mode and a retreating mode to transmit the same to said output shaft.